

# Factors associated with frailty syndrome in elderly people with Parkinson's disease

*Fatores associados à síndrome de fragilidade em idosos com doença de Parkinson*

*Factores relacionados a la síndrome de fragilidad en ancianos con enfermedad de Parkinson*

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## ABSTRACT

**Objectives:** to analyze the sociodemographic and clinical factors associated with frailty in the elderly with Parkinson's disease in the context of a Specialized Health Care Service for the Elderly. **Methods:** documentary, analytical, correlational, cross-sectional study carried out with 230 elderly people with Parkinson's. The medical records of the patients were evaluated with a focus on two instruments: Clinical-Functional Vulnerability Index – 20; and the Multidimensional Assessment Care Plan. **Results:** predominance of elderly people between 80 and 89 years old; women; with low education; classified as fragile. There was a correlation between frailty and the variables: sex; age; age group; schooling; motor manifestations; non-motor manifestations; Hoehn and Yahr staging and time to diagnosis. **Conclusions:** high simultaneity of frailty conditions and Parkinson's disease was observed. It is believed that the results will be able to help the structuring of protocols for nursing performance in a systematic way in the promotion of self-care of these individuals.

**Descriptors:** Parkinson Disease; Aged; Health Vulnerability; Frailty; Nursing.

## RESUMO

**Objetivos:** analisar os fatores sociodemográficos e clínicos associados à fragilidade em idosos com doença de Parkinson no contexto de um Serviço de Atenção Especializada em Saúde do Idoso. **Métodos:** estudo documental, analítico, correlacional, de corte transversal, realizado com 230 idosos com Parkinson. Foram avaliados os prontuários dos pacientes com enfoque em dois instrumentos: Índice de Vulnerabilidade Clínico-Funcional – 20; e o Plano de Cuidados da avaliação multidimensional. **Resultados:** predomínio de idosos entre 80 e 89 anos; sexo feminino; com baixa escolaridade; classificados como frágeis. Houve correlação entre a fragilidade e as variáveis: sexo; idade; faixa etária; escolaridade; manifestações motoras; manifestações não motoras; estadiamento de Hoehn e Yahr e tempo de diagnóstico. **Conclusões:** constatou-se alta simultaneidade das condições de fragilidade e doença de Parkinson. Acredita-se que os resultados poderão auxiliar a estruturação de protocolos para atuação da enfermagem de forma sistematizada na promoção do autocuidado desses indivíduos.

**Descritores:** Doença de Parkinson; Idoso; Vulnerabilidade em Saúde; Fragilidade; Enfermagem.

## RESUMEN

**Objetivos:** analizar factores sociodemográficos y clínicos relacionados a la fragilidad en ancianos con enfermedad de Parkinson en el contexto de un Servicio de Atención Especializada en Salud del Anciano. **Métodos:** estudio documental, analítico, correlacional, de cohorte transversal, realizado con 230 ancianos con Parkinson. Fueron evaluados prontuarios de los pacientes basados en dos instrumentos: Índice de Vulnerabilidad Clínico-Funcional – 20; y el Plan de Cuidados de la evaluación multidimensional. **Resultados:** predominio de ancianos entre 80 y 89 años; sexo femenino; con baja escolaridad; clasificados como frágiles. Hubo correlación entre la fragilidad y las variables: sexo; edad; franja etaria; escolaridad; manifestaciones motoras; manifestaciones no motoras; estadios de Hoehn y Yahr y tiempo de diagnóstico. **Conclusiones:** constatado alta simultaneidad de las condiciones de fragilidad y enfermedad de Parkinson. Considerado que los resultados podrán auxiliar la estructuración de protocolos para actuación de la enfermería de manera sistematizada en la promoción del autocuidado de esos individuos.

**Descriptores:** Enfermedad de Parkinson; Anciano; Vulnerabilidad en Salud; Fragilidad; Enfermería.

## INTRODUCTION

Among the chronic-degenerative and disabling diseases, Parkinson's disease (PD) stands out, as it is the second most common of this group in the elderly population, behind only Alzheimer's disease<sup>(1)</sup>. It affects about 1% of the population over 65 years of age and may reach more than 8 million people in 2030<sup>(1-2)</sup>. It is defined as a degenerative and progressive pathology that affects the central nervous system, in which the degeneration of neurons located in the so-called "black substance" occurs, causing a decrease in the production of the neurotransmitter dopamine<sup>(2-3)</sup>.

In PD, motor disorders such as resting tremor, rigidity, bradykinin, and postural instability are observed, in addition to autonomic dysfunctions such as hypotension, constipation and sleep disorders, the latter three being associated with a decrease in catecholamines and serotonin. The progression of the disease differs between patients, and in advanced stages it can affect the neocortex and, consequently, cause cognitive disorders and dementia<sup>(2-3)</sup>.

Therefore, PD patients may be physically and socially vulnerable, since their functionality may be affected<sup>(4)</sup>. Functionality is expressed by functional capacity (FC), the main health indicator in the elderly population, defined as the ability to take care of one's life autonomously and independently. Activities of daily living (ADL) are tasks related to caring for the environment and the body, performed daily and that can characterize the individual's FC<sup>(5)</sup>.

Increasingly prevalent and bothersome non-motor symptoms and treatment-resistant motor complications, such as freezing of gait, postural instability, and recurrent falls, account for a considerable part of the progressive disability in Parkinson's disease, contributing to functional impairment and the worsening of the quality of life of these patients<sup>(6-7)</sup>. The reduction in the functional capacity of the elderly with Parkinson's disease can trigger the development of frailty, defined as a geriatric clinical syndrome, with a multidimensional character<sup>(8-9)</sup>.

Fragility syndrome involves a physiological state that increases the vulnerability to stressors by decreasing physiological reserves and deregulation of multiple systems; This is associated with the highest occurrence of adverse outcomes as a decline in functional capacity, greater risk of complications, falls, hospitalization, institutionalization and even death, and increases the costs of health care<sup>(8-10)</sup>.

There is a diversity of conceptual and operational models for frailty<sup>(10)</sup>. Among them, three stand out: the reduction in functional reserve, which involves multiple organic systems and whose most used scale to implement this definition is composed of items that assess nutritional status, energy expenditure, physical activity, mobility and muscle strength<sup>(11)</sup>; the second model is the accumulation of deficits, based on the sum of limitations and diseases, with emphasis on the number of these disorders rather than their nature<sup>(12)</sup>; and the third conceptual model is the multidimensional one, characterized as a dynamic state of loss that affects one or more areas such as cognition, physical aspects and social domain<sup>(13)</sup>.

In the present study, the third model is adopted, which includes the concept of Moraes et al.<sup>(14)</sup>, who consider the reduction of the homeostatic reserve or the ability to adapt to biopsychosocial aggressions as multidimensional fragility, which leads to an increase in

vulnerability to functional decline and its consequences. It has the Clinical-Functional Vulnerability Index (IVCF-20) as a frailty screening instrument, which consists of a questionnaire that includes multidimensional aspects of the health condition of the elderly<sup>(9)</sup>.

The frailty syndrome should be recognized as a target for investigations and interventions, given the impact on elderly individuals with Parkinson's disease, their families and society as a whole. Thus, the early identification of the characteristics of different elderly people with PD and their association with frailty can help to delay the progression of functional decline, through care programs and the adequacy of health services to the new demands of this specific population<sup>(15)</sup>.

In this sense, the nurse plays an important role in this process, since, considering the individual's ability to self-care based on the frailty profile and factors associated with functional impairment, he can motivate and enable the sick individual and his family to become protagonists in the management of their health problems and in the adoption of self-care actions.

The literature still does not present studies and significant evidence on the interaction between comorbidities and frailty, especially regarding PD. This gap needs to be filled by carrying out scientific investigations that seek to contribute to the identification of frailty and associated factors in PD. This is important because of its potential for building public health policies involving the planning of preventive, diagnostic and therapeutic actions, aimed at maintaining physical and mental health, functional capacity, quality of life for this population and even serve to avoid unfavorable outcomes such as institutionalization, hospitalization, and early death<sup>(16)</sup>.

PD and frailty are two conditions that become increasingly common with advancing age, but little is known about the relationship between them<sup>(17)</sup>. Frailty, considered a geriatric syndrome associated with important adverse health outcomes, has received little attention in studies on PD. The literature on frailty in PD is extremely limited, with few studies evaluating its frequency and clinical features<sup>(6,18)</sup>.

Thus, it is increasingly necessary to assess the prevalence of frailty and understand which factors have been most associated with limitations in the functionality of elderly people with PD. With this, health programs can be organized with the main purpose of promoting self-care, aiming at maintaining, delaying the decline and/or increasing functional capacity.

## OBJECTIVES

To analyze the sociodemographic and clinical factors associated with frailty in the elderly with Parkinson's disease in the context of a Specialized Health Care Service for the Elderly.

## METHODS

### Ethical aspects

The project complied with the recommendations of Resolutions n. 466/2012 and no. 510/2016 of the National Health Council, which regulate research involving human beings in Brazil<sup>(19-20)</sup>. This study is linked to the macro-project entitled "Effect of nursing

interventions in the perspective of supported self-care in elderly people with Parkinson's disease: Randomized Clinical Trial" and was approved by the Research Ethics Committee of the Federal University of Minas Gerais.

### Design, study location and period

This is an analytical, correlational, cross-sectional, and retrospective study. A secondary analysis of data from medical records and care plans for the elderly was performed, considering the time frame for the years 2018 and 2019. A convenience sample was used, consisting of elderly people with Parkinson's disease treated at a Reference Center for Elderly Health — Belo Horizonte, state of Minas Gerais (MG), Brazil — which provides care to elderly people referred by Primary Health Care (PHC) units.

These patients are attended by a specialized geriatric-gerontological team, composed of geriatricians, gerontological nurses, pharmacists, nutritionists, social workers, and rehabilitation professionals, such as physical therapists, occupational therapists, and speech therapists.

In this study, the medical records were analyzed, initially from the first care for the elderly performed by professionals trained in the application of broad geriatric assessment, through the instruments Clinical-Functional Vulnerability Index-20 (IVCF-20) and Care Plan, which contain a summary of the assessment of the elderly based on standardized scales and instruments for use in the global assessment of the elderly. The data from the medical records were collected from October to December 2020 and refer to the consultations carried out in the years 2018 and 2019, and this work was carried out by the first author, who works at the aforementioned Reference Center, and by two bursars from properly trained scientific initiation.

### Sample; inclusion and exclusion criteria

During this period, 10,399 patients underwent a multidimensional assessment, of which 9,202 had the care plan prepared for this assessment completed and counter-referred via email to the PHC. The care plan consists of a set of diagnoses and interventions, defined individually, and shared with Primary Care, which is responsible for implementing the care plan in less complex cases. The elderly people with greater complexity are followed up by the geriatrics and gerontology service of Secondary Care.

To compose the sample of this study, the medical records that met the eligibility criteria were selected: patients with clinically confirmed Parkinson's disease diagnosis record and complete completion of the IVCF-20 instrument. The medical records of patients with a record of parkinsonism who were not classified as Parkinson's disease or who were still being followed up to define the cause of parkinsonism were excluded. Based on these criteria, the study sample consisted of 230 patients with PD.

Follows Flowchart with final sample of the study.

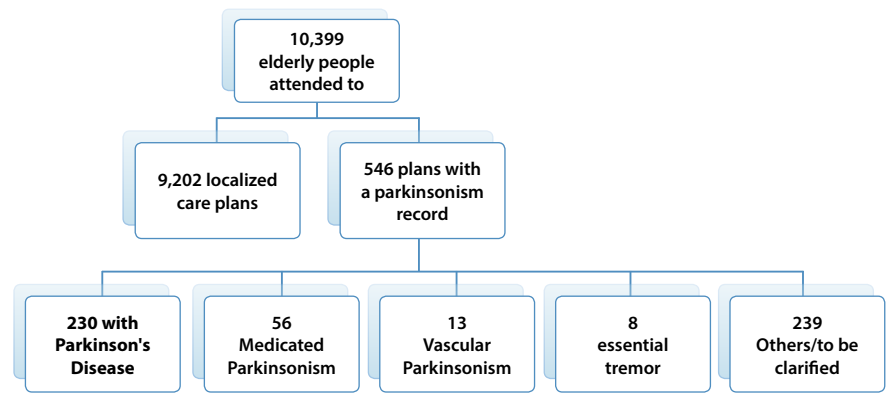


Figure 1 – Final study sample

### Study protocol

For data collection, the Care Plan was used, developed for all the elderly referred for multidimensional evaluation in the geriatrics and gerontology service of the aforementioned Specialized Care Center. The Care Plan is the strategy used for the organization of care, in which the health problems of the elderly are defined, the interventions with the justifications for the most appropriate changes to improve their health and which health professionals and equipment necessary are used for the implementation of these interventions<sup>(21)</sup>.

The Care Plan contains all the essential information for the planning and implementation of the actions necessary for the maintenance or recovery of the health of the evaluated elderly and presents the main sociodemographic data for identifying the elderly, the risk stratification based on the clinical-functional classification, with the Frailty score and markers indicated in the Clinical-Functional Vulnerability Index (IVCF-20), a visual scale of frailty, diagnosis of acute and/or mainly chronic health conditions, proposed interventions, translated into therapeutic goals<sup>(21)</sup>.

To track frailty in the assessment of the elderly, the Clinical-Functional Vulnerability Index (IVCF-20) instrument is initially adopted, as it is an interdisciplinary screening instrument, which includes multidimensional aspects of the health condition of individuals aged 60 years old or more. Subsequently, the Comprehensive Geriatric Assessment (CGA) is applied with all its instruments and scales. The IVCF-20 is multidimensional, designed considering the conceptual basis of frailty as a multidimensional syndrome; and consists of 20 questions distributed in eight sections that cover predictive conditions of clinical-functional decline in the elderly (age, self-perception of health, functional disabilities, cognition, mood, mobility, communication and multiple comorbidities)<sup>(9,22)</sup>.

The score ranges from 0 to 40; and the higher the IVCF-20 score, the worse the functional clinical condition of the elderly person will be. The classification of the clinical-functional condition of the elderly is based on the following criteria: score from 0 to 6, the elderly are considered robust; 7 to 14, the elderly are considered at risk of frailty; and values equal to or above 15 points, the elderly person is considered to be in a fragile condition<sup>(9,22)</sup>.

## Analysis of results and statistics

The data obtained from the care plans/medical records were typed and stored in an electronic spreadsheet in the Microsoft Office Excel® 2010 program, according to the coding determined for each of the variables of interest in the study. In the construction of the database, the technique of validation by double entry was chosen, that is, double typing that detects possible inconsistencies. After validation of the databases, the data were exported to the R software, version 4.0.0, for processing the analyzes.

The variables used in this study are related to sociodemographic, clinical and clinical-functional vulnerability issues (frailty): age (years and age group); sex; schooling; motor manifestations; non-motor manifestations; motor staging of Parkinson's disease (Hoehn and Yahr); time of PD diagnosis (years); antiparkinsonian medication; clinical-functional classification (frailty), which was categorized into frail (IVCF-20 score  $\geq 15$ ) and non-frail (robust and risk of frailty – IVCF-20 score from 0 to 14).

Qualitative variables were presented in tables with absolute and relative frequencies. Quantitative variables passed the Shapiro-Wilk normality test and indicated non-normality. Therefore, the results are presented as median and quartiles. For associations, the chi-square test and Fisher's exact test were performed for qualitative variables; and the nonparametric Mann-Whitney test for quantitative variables (two categories). Estimates were presented considering a significance level of 5% ( $p < 0.05$ ) in all analytical procedures<sup>(23)</sup>. The results were described and presented in tables.

## RESULTS

In the evaluation of the care plans / medical records of the elderly analyzed in the years 2018 and 2019, a total of 546 elderly people were initially selected with the report of the presence of parkinsonism, corresponding to a prevalence of 5.93% with such characteristics in the evaluated population. Of these, 230 elderly people had the diagnosis of PD clinically confirmed and recorded in the medical records, which corresponds to a prevalence of 2.50% of PD in that population.

According to the results presented in Table 1, of the 230 individuals with PD evaluated, 74.3% were classified as frail and 25.7% as non-frail (strong or at risk of frailty). The score in the Clinical-Functional Vulnerability Index instrument (IVCF-20) obtained a median of 20.

Table 2 shows the frequency of sociodemographic variables (gender, age group and education) related to the clinical-functional classification of the elderly with PD. The median age of the elderly people with PD found in the study was 80 years old, with the first quartile being 73 years old and

the third quartile being 85 years old. There was a predominance of individuals aged between 80 and 89 years, female and with low education (one to four years of study).

Based on the inferential statistics of the sociodemographic variables associated with the clinical-functional classification of the elderly with PD, a statistically significant association was found with the variables "age", "age group", "sex" and "education".

Table 3 presents the distribution and analysis of the inferential statistics of the variables of the sets "motor manifestations" and "non-motor manifestations" associated with the frailty of the elderly with PD.

**Table 1** – Score on the Clinical-Functional Vulnerability Index (IVCF-20) and distribution of the clinical-functional classification of the elderly with Parkinson's disease treated at *Centro Mais Vida*, Belo Horizonte, Minas Gerais, Brazil, 2021

IVCF-20 Score	Median 20 n	(Q1 - Q3)* (14 - 26) %
Clinical-functional classification		
Robust	19	8.3
Risk of frailty	40	17.4
Frail	171	74.3
Total	230	100.0

\* Q1 - Q3: first quartile - third quartile.

According to the p values in Table 3, there is a significant correlation between frailty and the motor variables "tremor", "stiffness", "postural instability", "speech/conversation" and "chewing/swallowing"; and the non-motor variables "cognitive disorder", "mood disorder/depression", "hallucinations/delusions", "apathy" and "urinary disorder".

The description in Table 4 provides the profile of study participants according to the degree of disability based on the staging of Hoehn and Yahr disease, time of disease diagnosis and pharmacological treatment. It also presents the results obtained from the analysis of the association of these variables with the clinical-functional classification of the elderly with PD.

**Table 2** – Distribution of sociodemographic variables according to the clinical-functional classification of the elderly with Parkinson's disease treated at *Centro Mais Vida*, Belo Horizonte, Minas Gerais, Brazil, 2021

Clinical-functional variables/classification	Not frail (n = 59)		Frailty		Total (n = 230)		p value*
	n	%	Frail (n = 171) n	%	n	%	
Age group							
60 to 69 years	16	27.1	17	9.9	33	14.3	0.003***
70 to 79 years	22	37.3	54	31.6	76	33.0	
80 to 89 years	18	30.5	84	49.1	102	44.3	
90 years or older	3	5.1	16	9.4	19	8.4	
Median age (Q1 - Q3)**	76 (68 - 82)		81 (75 - 86)		80 (73 - 85)		0.000***
Sex							
Male	34	57.6	72	42.1	106	46.1	0.039***
Female	25	42.4	99	57.9	124	53.9	
Educational level							
Did not study	2	3.5	45	26.3	47	20.4	0.007***
1 to 4 years	42	70.1	92	53.9	134	58.2	
5 to 8 years	5	8.8	14	8.4	19	8.3	
9 to 11 years	8	14	14	8.4	22	9.6	
more than 11 years	2	3.5	6	3	8	3.5	

\* Chi-square test; \*\* Mann-Whitney test; \*\*\* significant p value.



**Table 3** – Distribution of motor and non-motor manifestations according to the functional clinical classification of the elderly with Parkinson's disease treated at *Centro Mais Vida*, Belo Horizonte, Minas Gerais, Brazil, 2021

Clinical-functional variables/classification	Frailty						p value*
	Not frail		Frail		Total		
	n	%	n	%	n	%	
Motor Manifestations							
Tremors	41	87.2%	99	71.7%	140	75.7%	0.032***
Stiffness	25	53.2%	107	77.5%	132	71.4%	0.001***
Bradykinesia	34	72.3%	101	73.2%	135	73.0%	0.910
Freezing (freezing)	1	1.9%	16	10.5%	17	8.3%	0.054
Postural Instability	33	55.9%	134	78.4%	167	72.6%	0.001***
Speech/conversation	11	18.6%	60	35.1%	71	30.9%	0.018***
Excess of salivation	2	3.4%	14	8.2%	16	7.0%	0.212
Chewing/swallowing	6	10.2%	59	34.5%	65	28.3%	0.000***
Writing (micrograph)	1	1.7%	2	1.2%	3	1.3%	0.759
Non-Motor Manifestations							
Cognitive Disorder	11	18.6%	104	60.8%	115	50.0%	0.000***
Mood Disorder/Depression	31	52.5%	128	74.9%	159	69.1%	0.001***
Hallucinations and delusions	3	5.1%	41	24.0%	44	19.1%	0.001***
Anxiety	14	23.7%	31	18.1%	45	19.6%	0.350
Apathy	2	3.4%	28	16.4%	30	13.0%	0.011***
Fatigue	3	5.1%	15	8.8%	18	7.8%	0.363
Sleep disorder	28	50.9%	99	61.5%	127	58.8%	0.169
Urinary disorder	29	49.2%	132	77.2%	161	70.0%	0.000***
Postural hypotension	11	18.6%	27	15.8%	38	16.5%	0.611
Cold	18	30.5%	72	42.1%	90	39.1%	0.116
Pain	11	18.6%	46	26.9%	57	24.8%	0.205

\* Chi-square test; \*\*\* significant p value.

**Table 4** – Distribution of clinical variables according to the clinical-functional classification of the elderly with Parkinson's disease treated at *Centro Mais Vida*, Belo Horizonte, Minas Gerais, Brazil, 2021

Clinical-functional variables/classification	Frailty						p value*
	Not frail		Frail		Total		
	n	%	n	%	n	%	
Staging							
Light	29	50.0%	16	9.5%	45	19.8%	0.000***
Moderate	25	43.1%	62	36.7%	87	38.3%	
Serious	4	6.9%	91	53.8%	95	41.9%	
Diagnosis time							
Median (Q1 - Q3)**	2 (0 - 6.5)		4 (1 - 9)		4 (0 - 8)		0.034***
Makes use of prolopa							
No	1	1.9%	8	5.1%	9	4.2%	0.312
Yes	53	98.1%	150	94.9%	203	95.8%	
Take another medication antiparkinsonian							
No	44	81.5%	125	79.1%	169	79.7%	0.709
Yes	10	18.5%	33	20.9%	43	20.3%	
Type of other Antiparkinsonian's medication							
Pramipexol	5	50.0%	16	48.5%	21	48.8%	0.693
Entacapone	2	20.0%	10	30.3%	12	27.9%	
Amantadina	2	20.0%	2	6.1%	4	9.3%	
Pramipexol + entacapone	1	10.0%	4	12.1%	5	11.6%	
Pramipexol + amantadina	0	0.0%	1	3.0%	1	2.3%	

\* Chi-square test; \*\* Mann Whitney test; \*\*\* significant p value.

According to these data (Table 4), there is a higher prevalence of severe disease (Grade 4 and 5), followed by the moderate stage (Grade 3). The study sample consisted mainly of elderly people with PD in more advanced stages of disability. The median time since diagnosis was four years, and a high prevalence of treatment with levodopa was observed. There is a significant association between frailty and the variables "Hoehn and Yahr staging" (most non-frail are classified as mild; and, among the frail, most are

classified as severe) and "time since diagnosis of the disease" (frail elderly people have a longer diagnosis time).

## DISCUSSION

In Brazil, epidemiological studies on the incidence and prevalence of parkinsonism and PD are still scarce. An important population-based cross-sectional study with assessment of the prevalence of PD and parkinsonism carried out in Brazil was the Bambuí study<sup>(24)</sup>, which showed, in the population over 64 years of age, a prevalence of parkinsonism of 7.2%, being the most common cause of frequent PD, with 3.3% of the total sample.

The findings of the majority of the female elderly with PD and with low schooling corroborate those of some studies<sup>(25-28)</sup>. However, other studies<sup>(4,29)</sup> found a predominance of males in their samples.

It is observed, in this study, in relation to the distribution of the sample according to age, that there is a predominance of PD in the older age groups. This result converges with a study<sup>(30)</sup> and diverges from others<sup>(4,25)</sup> that found a predominance of PD in the younger age groups from 60 to 69 years old.

The prevalence of frailty in the sample studied was very high (74.3%), confirming studies in which the prevalence of frailty in PD is high. A systematic review shows that few studies have quantified the prevalence of frailty in PD, but those that have done so suggest a high simultaneity of these two conditions, with a prevalence of frailty in PD ranging from 29% to 67% being pointed out in the review<sup>(17)</sup>. In another cohort study, the prevalence of frailty was 35.6% in individuals with PD from a tertiary care center and 22.2% in a sample of PD in the community<sup>(6)</sup>.

In this study, the factors that were significantly associated with the frailty of the elderly with PD were: gender; age; age group; schooling; motor manifestations (tremor; rigidity; postural instability; speech/speech and chewing/swallowing); non-motor manifestations (cognitive disorder; mood disorder/depression; hallucinations/delusions; apathy and urinary disorder) and clinical variables (Hoehn and Yahr staging and time to diagnosis).

One of the most affected dimensions in PD is the functionality that is expressed by the functional capacity. In an investigation

carried out in Curitiba, it was observed that, in addition to age, low education and widowhood are factors related to the functional decline of elderly people with PD and, consequently, lead to the frailty of this population<sup>(4)</sup>.

The result of an observational cohort study carried out in São Paulo shows that there is a positive correlation between the increase in frailty in PD with older age and lower schooling of individuals, with non-motor manifestations of the disease, impaired cognition, gait speed, staging of Hoehn and Yahr and increasing scores obtained on the Unified Parkinsons Disease Rating Scale (UPDRS), which measures the severity and evolution of PD. Physical activity was observed as a protective effect for the development of frailty<sup>(16)</sup>.

Advanced age and worse motor severity of PD were considered predictors of frailty in PD<sup>(18)</sup>. In another study, frailty was significantly associated with advanced age, longer disease duration, decreased handgrip strength and gait speed, which indicate sarcopenia; greater motor impairment on the UPDRS scale; higher Hoehn and Yahr stages; decreased quality of life; greater frequency of falls; greater burden of non-motor symptoms (cognitive impairment, dementia, fatigue and hallucinations); as well as institutionalization, worse quality of life and greater demand for care in patients with PD<sup>(6)</sup>.

Frailty is associated with clinical features of advanced PD, in particular: longer disease duration, higher Hoehn and Yahr stages, greater motor impairment and non-motor burden including dementia, falls, reduced quality of life, as well as institutionalization. This is in agreement with findings in the literature that evaluated frailty in patients with PD<sup>(6,16)</sup>.

Altered neuromuscular control resulting in gait difficulties, lower gait speed and falls has been described in patients with PD and is also associated with sarcopenia and frailty. A high frequency of falls was more commonly reported by individuals with PD who had sarcopenia and frailty compared to those without these last two conditions, which reinforces the importance of tracking postural instability and falls in PD<sup>(6)</sup>.

Progressive disability in PD is driven by the evolution of treatment-resistant motor symptoms, such as freezing of gait, postural instability, and recurrent falls, as well as increasingly prevalent and uncomfortable non-motor symptoms, which are an important determinant of quality of life and quality of institutionalization<sup>(6)</sup>. Non-motor symptoms and motor complications are responsible for a considerable part of disability in Parkinson's disease, so they must be identified and treated<sup>(7)</sup>.

Despite the existence of numerous advances in the treatment of symptoms presented by patients, PD generates a compromise in functionality with observation of progressive clinical deterioration, which occurs in parallel with advancing age and, associated with other factors, causes the determination of frailty<sup>(31-32)</sup>.

The diagnosis of frailty in the early stages of PD can contribute to improving the efficiency of therapeutic intervention proposals and with actions to promote the maintenance of functional capacity or delay possible declines, since frailty is recognized as a modifier of risks and benefits the treatment of chronic diseases such as PD<sup>(31-32)</sup>.

It is known that the neuromuscular degenerative changes caused by PD, when associated with frailty, result in an exacerbation

of the disease's motor manifestations; this further compromises the functional capacity of individuals, who manifest even more exhaustion due to greater muscle fatigue in these situations, generating increasing needs for both physical and cognitive effort to perform the same functions over time<sup>(31)</sup>.

The early identification of frailty in individuals with PD could improve the prognosis of the disease, as it would allow the identification of signs and symptoms that are treatable and even preventable. This confirms the therapeutic value of identifying frailty in these individuals, considering that, when associated with PD, it further compromises quality of life, functional capacity and can even lead to early death<sup>(16,31-32)</sup>.

The need for integrated and continuous care for the elderly diagnosed with PD stands out, which must be done in an integrated way in the health network through the sharing of actions in PHC and in the secondary service of specialized care. Multi-professional and interdisciplinary work is fundamental in this process, with the development of actions to maintain and/or rehabilitate functionality, through health promotion and prevention of clinical and functional vulnerability, delaying the development of frailty and complications.

### Study limitations

It is important to consider some limitations of this study, among which, the performance of a cross-sectional study of document analysis, with investigation in a single sample group, consisting of patients in more advanced stages of the disease from a specialized care center. Therefore, prevalence rates and demographic and clinical associations are representative for PD patients in secondary centers, in more advanced stages of the disease, and may not be generalizable to the general population with PD. The cross-sectional nature of the present study did not allow a prospective assessment of risk factors for frailty in PD.

### Contributions to the area of nursing, health, or public policy

Significant contributions to the knowledge of nursing in gerontology are pointed out, specifically in the approach to frailty in populations with neurodegenerative diseases of the central nervous system. The occurrence of frailty in people with PD implies a greater demand for nursing care and the need for greater participation of the family/caregivers in the care relationship. It is believed that the results of the study may help the structuring of protocols for nursing performance in a systematic way in the promotion of self-care, focusing on the functional capacity of elderly people affected by PD, contributing to increase the quality of life of sick individuals and their families.

### CONCLUSIONS

The present study demonstrated a high prevalence of frailty in elderly people with PD. The relationship of frailty with the variables is highlighted: sex; age; age group; schooling; motor manifestations (tremor; rigidity; postural instability; speech/speech and chewing/swallowing); non-motor manifestations (cognitive disorder; mood disorder/depression; hallucinations/

delusions; apathy and urinary disorder) and clinical variables (Hoehn and Yahr staging and time to diagnosis).

The typical alterations of PD, such as non-motor manifestations and motor complications, which can cause functional changes in the individual, making him more dependent and with greater need for care, need to be identified and treated. In this sense, the need to evaluate and monitor these changes is emphasized, together with the variables associated with fragility in the care of individuals with PD, since they can interfere with the worsening

of the functional capacity and, consequently, of the quality of life of this population.

The contribution of studies that evaluate possible associations between sociodemographic and clinical factors as determinants in understanding the development of frailty in individuals with PD is highlighted. These studies allow the early and effective identification of individuals who are at greater risk of developing unfavorable outcomes such as institutionalization, hospitalization, and even early death.

## REFERENCES

1. Cabreira V, Massano J. Doença de Parkinson: revisão clínica e atualização. *Acta Med Port.* 2019;32(10):661-70. <https://doi.org/10.20344/amp.11978>
2. Chou KL. Diagnosis and differential diagnosis of Parkinson disease. UpToDate [Internet]. 2020[cited 2021 Apr 24]. Available from: <https://www.uptodate.com/contents/diagnosis-and-differential-diagnosis-of-parkinson-disease>
3. Hayes MT. Parkinson's Disease and Parkinsonism. *Am J Med.* 2019;132(7):802-7. <https://doi.org/10.1016/j.amjmed.2019.03.001>
4. Leandro LA, Teive HAG. Fatores associados ao desempenho funcional de idosos portadores da Doença de Parkinson. *Rev Kairós Gerontol.* 2017;20(2):161-78. <https://doi.org/10.23925/2176-901X.2017v20i2p161-178>
5. Moraes EN, Moraes FL. Avaliação Multidimensional do Idoso. 5.ed. Belo Horizonte: Folium, 2016.
6. Peball M, Mahlknecht P, Werkmann M. Prevalence and associated factors of sarcopenia and frailty in parkinson's disease: a cross-sectional study. *Gerontology.* 2019;65:216-28. <https://doi.org/10.1159/000492572>
7. Vetrano DL, Pisciotta MS, Laudisio A, Lo Monaco MR, Onder G, Brandi V et al. Sarcopenia in Parkinson disease: comparison of different criteria and association with disease severity. *J Am Med Dir Assoc.* 2018;19(6):523-27. <https://doi.org/10.1016/j.jamda.2017.12.005>
8. Maciel GMC, Santos RS, Santos TM, Menezes RMP, Vitor AF, Lira ALBC. Avaliação da fragilidade no idoso pelo enfermeiro: revisão integrativa. *Rev Enferm Cent-Oeste Min.* 2016; 6(3):2430-38. <https://doi.org/10.19175/recom.v6i3.1010>
9. Moraes EN, Carmo JA, Lanna FM, Azevedo RS, Machado CJ, Montilla DER. Clinical-Functional Vulnerability Index-20 (IVCF-20): Rapid recognition of frail older adults. *Rev Saúde Pública* 2016;50:81. <https://doi.org/10.1590/S1518-8787.2016050006963>
10. Lourenço RA, Moreira VG, Mello RGB, Santos IS, Lina SM, Pinto ALF, et al. Consenso brasileiro de fragilidade em idosos: conceitos, epidemiologia e instrumentos de avaliação. *Geriatr Gerontol Aging.* 2018;12(2):121-35. <https://doi.org/10.5327/Z2447-211520181800023>
11. Fried LP, Tangen CM, Walston J, Newman AB, Hirsch C, Gottdiener J, et al. Frailty in older adults: evidence for a phenotype. *J Gerontol A Biol Sci Med Sci.* 2001;56(3):M146-57. <https://doi.org/10.1093/gerona/56.3.M146>
12. Mitnitski AB, Mogilner AJ, Rockwood K. Accumulation of deficits as a proxy measure of aging. *Scientific World J.* 2001;1:323-36. <https://doi.org/10.1100/tsw.2001.58>
13. Fabrício-Wehbe SC, Cruz IR, Haas VJ, Diniz MA, Dantas RA, Rodrigues RA. Reproducibility of the Brazilian version of the Edmonton Frail Scale for elderly living in the community. *Rev Latino-Am Enfermagem.* 2013;21(6):1330-6. <https://doi.org/10.1590/0104-1169.2933.2371>
14. Moraes EN, Lanna FM, Santos RR, Bicalho MAC, Machado CJ, Romero DE. A new proposal for the clinical-functional categorization of the elderly: Visual Scale of Frailty (VS-Frailty). *J Aging Res Clin Pract.* 2016; 5(1):24-30. <https://doi.org/10.14283/jarcp.2016.84>
15. Maia LC, Colares TFB, Moraes EN, Costa SM, Caldeira AP. Robust older adults in primary care: Factors associated with successful aging. *Rev Saúde Pública* 2020;54(35):1-11. <https://doi.org/10.11606/s1518-8787.2020054001735>
16. Montgomery RM. Fragilidade e Doença de Parkinson [Tese]. Universidade de São Paulo. Faculdade de Medicina. São Paulo, 2018.
17. Smith N, Brennan L, Gaunt DM, Ben-Shlomo Y, Henderson E. Frailty in Parkinson's Disease: a systematic review. *J Parkinsons Dis.* 2019;9(3):517-24. <https://doi.org/10.3233/JPD-191604>
18. Tan AH, Hewb YC, Lim SY. Altered body composition, sarcopenia, frailty, and their clinico-biological correlates, in Parkinson's disease. *Parkinsonism Relat Disord.* 2018;56:58-64. <https://doi.org/10.1016/j.parkreldis.2018.06.020>
19. Ministério da Saúde (BR). Resolução nº 466/12, de 12 de dezembro de 2012. Dispõe sobre pesquisa envolvendo seres humanos [Internet]. Brasília: Ministério da Saúde; 2012 [cited 2020 Jun 16]. Available from: [http://bvsms.saude.gov.br/bvs/saudelegis/cns/2013/res0466\\_12\\_12\\_2012.html](http://bvsms.saude.gov.br/bvs/saudelegis/cns/2013/res0466_12_12_2012.html)
20. Ministério da Saúde (BR). Resolução nº 510/16, de 07 de abril de 2016. Dispõe sobre as normas aplicáveis a pesquisas em Ciências Humanas e Sociais [Internet]. Brasília: Ministério da Saúde; 2016 [cited 2020 Jun 16]. Available from: [https://bvsms.saude.gov.br/bvs/saudelegis/cns/2016/res0510\\_07\\_04\\_2016.html](https://bvsms.saude.gov.br/bvs/saudelegis/cns/2016/res0510_07_04_2016.html)
21. Moraes EM. Atenção à saúde do idoso: aspectos conceituais [Internet]. Organização Pan-Americana de Saúde; 2012 [cited 2021 Feb 01]. 98p. Available from: <https://apsredes.org/pdf/Saude-do-Idoso-WEB1.pdf>

22. Moraes EN, Carmo JA, Machado CJ, Moraes FL. Índice de Vulnerabilidade Clínico-Funcional-20: proposta de classificação e hierarquização entre os idosos identificados como frágeis. *Rev Fac Ciênc Méd Sorocaba*. 2020;22(1):31-5. <https://doi.org/10.23925/1984-4840.2020v22i1a7>
  23. Hair JF, Anderson RE, Tatham RL, Black WC. *Análise Multivariada de dados*. 6. ed. Porto Alegre: Bookman; 2009.
  24. Barbosa MT, Caramelli P, Maia DP, Cunningham MCQ, Guerra HL, Lima-Costa MF, et al. Parkinsonism and Parkinson's disease in the elderly: a community-based survey in Brazil (the Bambuí study). *Movement Disorder*. 2006;21:800-8. <https://doi.org/10.1002/mds.20806>
  25. Baptista R, Alvarez AM, Nunes SFL, Valcarenghi RV, Barbosa SFF. Idosos com Doença de Parkinson: perfil e condições de saúde. *Enferm Foco [Internet]* 2019; [cited 2021 May 18];10(5):99-102. Available from: <http://revista.cofen.gov.br/index.php/enfermagem/article/view/2604/640>
  26. Hirsch L, Jette N, Frolkis A, Steeves T, Pringsheim T. The incidence of Parkinson's disease: a systematic review and meta-analysis. *Neuroepidemiology*. 2016;46(4):292-300. <https://doi.org/10.1159/000445751>
  27. Ribas CG, Silva LA, Corrêa MR, Teive HG, Valderramas S. Effectiveness of exergaming in improving functional balance, fatigue and quality of life in Parkinson's disease: a pilot randomized controlled trial. *Parkinsonism Relat. Disord*. 2017;38:13-18. <https://doi.org/10.1016/j.parkreldis.2017.02.006>
  28. Díez-Cirarda M, Ojeda N, Peña J, Cabrera-Zubizarreta A, Jiménez LO, Gómez-Esteban JC, et al. Long-term effects of cognitive rehabilitation on brain, functional outcome and cognition in Parkinson's disease. *Eur J Neurol*. 2018;25(1):5-12. <https://doi.org/10.1111/ene.13472>
  29. Liu K, Gu Z, Dong L, Shen L, Sun Y, Zhang T, et al. Clinical profile of Parkinson's disease in the Gumei community of Minhang district, Shanghai. *Clinics*. 2014;69(7):457-63. [https://doi.org/10.6061/clinics/2014\(07\)03](https://doi.org/10.6061/clinics/2014(07)03)
  30. Willis AW, Evanoff BA, Lian M, Criswell SR, Racette BA. Geographic and Ethnic Variation in Parkinson Disease: a population-based study of US Medicare Beneficiaries. *Neuroepidemiol*. 2010;34(3):143-51. <https://doi.org/10.1159/000275491>
  31. Onder G, Vetrano DL, Marengoni A, Bell JS, Johnell K, Palmer K. Accounting for frailty when treating chronic diseases. *Eur J Intern Med*. 2018;56:49-52. <https://doi.org/10.1016/j.ejim.2018.02.021>
  32. Silva RB, Aldoradin-Cabeza H, Eslick GD, Phu S, Duque G. The effect of physical exercise on frail older persons: a systematic review. *J Frailty Aging*. 2017;6(2):91-6 <https://doi.org/10.14283/jfa.2017.7>
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